with the touch is initiated. If it is determined that the touch is hard touch, an active action associated with the touch is performed (block **408**).

[0144] The touch method may additionally include a block where the one or more touches are classified as a primary touch or a secondary touch. Primary touches are touches that are intended to cause an action while secondary touches are touches that are not intended to cause an action. Gestures are examples of primary touches while a thumb positioned over the touch area to hold the device is an example of a secondary touch. Once the touches are classified as primary or secondary, the secondary touches are filtered out, and the determination of whether a touch is a light or hard touch is made with the primary touches.

5. Example of a New Touch Vocabulary

[0145] The z pressure exerted on a touch sensing device can be combined with the x and y locations of the touch to form a new touch vocabulary. As should be appreciated, up to this point touch vocabularies have only included x and y locations, not z pressure. A proposed touch vocabulary includes variety of variables including the UI mode, the force of the touch (e.g., light or hard), the number of fingers used, whether or not there is any movement during the touch, the duration of the touch, and the touch location, all or some of which can be combined to form a variety of behaviors and user feedback.

[0146] The UI mode is generally related to the mode or state of the device. Each device includes a variety of states and each state may require a different UI mode. A media player (a mode) may, for example, include a set of hierarchal layers (states) with each layer requiring a different UI.

[0147] As noted above, the force of the touch may, for example, be described as light or hard. A light touch may occur when a user lightly touches the surface of the touch surface, i.e., the finger hovers on top of the surface and is primarily moved in the x and y directions. A hard touch may occur when a user presses on the touch surface with a certain amount of force, i.e., the finger is primarily moved in the z direction against the touch surface.

[0148] Motion during the touch is used to describe whether the finger has remained stationary during a touch event or has substantially moved in the X-Y plane (e.g., translation, rotation, etc.). The motion may be described as none at all or a swipe or twist in some particular direction. By way of example, the swipe may be up, down, right, left, or some combination thereof, and the twist may be clockwise or counterclockwise.

[0149] Duration is defined as the amount of time the finger stays at any one point. Duration may be variable or it may include states such as short and long. The touch location may be a random point or a specific location such as an onscreen button.

[0150] **FIG. 26** is an additional touch method **500** implementing this technique. The method begins at block **502** when one or more touches are detected. Thereafter, in block **504**, the UI mode is determined. In block **506**, a determination is made as to whether the touches are light touches or hard touches. Alternatively, blocks **502** and **504** could be reversed, effectively resulting in an instance of the touch method for each mode. In block **508**, the number of distinct

touches (e.g., fingers) is determined. In block **510**, a determination is made as to whether the touches are stationary or in motion. In block **512**, the duration of the touches is determined. In block **514**, the locations of the touches are determined. Following blocks **502-514**, the method proceeds to block **516** where an action is performed based on the UI mode, the pressure of the touch, the number of touches, whether or not the touch is moving, the duration of the touch, and the touch location. The actions may be passive or active depending on the values of each characteristic.

[0151] One example of a touch vocabulary associated with a music player is shown in FIGS. **27A-E**.

V. Output Devices

A. Display

[0152] The principle output of a hand-held electronic device is typically a display. The display provides visual information in the form of text, characters or graphics. The display is usually a flat panel device although other types of displays may be used. The display may be a liquid crystal display (LCD) such as a character LCD that is capable of presenting text and symbols or a graphical LCD that is capable of presenting images, video, and graphical user interfaces (GUI). Alternatively, the display may correspond to a display based on organic light emitting diodes (OLED), or a display that is based on electronic inks.

[0153] Preferably, the display may be configured to substantially fill the front surface of the housing. The display may extend from one edge of the housing to the opposite edge of the housing, the housing may include a small bezel that surrounds the edges of the display. In either case, the display makes up a substantial portion of the front surface of the hand-held electronic device, thereby eliminating any space for buttons or switches associated with a conventional user interface.

[0154] As mentioned above, besides outputting visual information, the display may also act like an input device. For example, a touch screen may be positioned over the display, and/or sensors may be disposed underneath the display to sense when the device is pressed or otherwise moved. In most cases, the small form factor of hand-held devices requires central placement of the input interfaces to permit operation while being carried around and used by the hand. The display region provides a central location, which can be accessed by both the left and right hands.

[0155] The display region may be formed by more than one display. For example, the display region may be formed by a pair of displays that are side by side or one on top of the other. A first display may be used to present the standard screen and a second display may be used to present the control screen as described above with reference to **FIGS. 5-8**. Furthermore, a first display may be a conventional display while the second display may be a display actuator. Moreover, a first display may comprise of a first type and a second display may be of a second type. For example, the first display may be an LCD while the second display may be a display based on electronic inks.

[0156] The decision to use different types may be based on the fact that one of the displays may be dedicated to a standard viewing area while another may be dedicated to a